

Appl. No. 10/693,686
Amdt. Dated June 19, 2006
Reply to Office Action of December 22, 2005

•••REMARKS/ARGUMENTS•••

The Official Action of December 22, 2005 has been thoroughly studied. Accordingly, the changes presented herein for the application, considered together with the following remarks, are believed to be sufficient to place the application into condition for allowance.

By the present amendment, the specification has been changed at page 5 to delete the comma noted by the Examiner and to correct a typographical error on page 7.

In addition, the Abstract has been amended to conform to the requirements noted by the Examiner on page 2 of the Office Action.

Claim 15 has been amended to refer to the "resulting" vulcanization product in response to the rejection of claim 15 under 35 U.S.C. §112, second paragraph.

Finally, claim 2 has been changed to correct a typographical error.

Entry of the changes to the specification, Abstract and claims is respectfully requested.

Claims 1-18 are pending in this application.

Claims 10-12 and 16-18 stand withdrawn as being directed to a non-elected invention.

Claims 1-9 and 14 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 3,919,143 to Morris in view of European Patent Application No. EP 0 811 659 to Kobayashi et al. and U.S. Patent No. 4,931,509 to Yagishita et al.

Claims 1-9 and 13-15 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Morris in view of Yagishita et al. and Japanese reference No. 07-278426 to Tomoshige et al.

Appl. No. 10/693,686
Amdt. Dated June 19, 2006
Reply to Office Action of December 22, 2005

For the reasons set forth below, it is submitted that all of the examined claims are allowable over the prior art of record and therefore, the outstanding prior art rejections of the claims should properly be withdrawn.

Favorable reconsideration by the Examiner is earnestly solicited.

The Examiner has relied upon Morris as disclosing:

... vulcanizable compositions containing halogen bearing elastomeric polymers. Additionally, the compositions comprise a cure system consisting essentially of (a) di- or polyfunctional carboxylic acid, (b) a quaternary ammonium salt or a monofunctional secondary or tertiary amine, and (c) a halide ion acceptor (abstract). Carboxylic acid is used at 0.1-10 parts by weight and quaternary ammonium salt at 0.1-10 parts by weight polymer (col 5, lines 9-26). Other ingredients such as fillers, extenders, oils, pigments, etc. can be added to the composition (col 10, lines 30-48). Di or polycarboxylic acids are disclosed in column 5, lines 27-57. The quaternary ammonium salt is disclosed in column 5, line 58 to column 6, line 41. Halide ion acceptors are disclosed in column 8, line 21 to column 9, line 39. Hydrotalcite is a mixed salt containing magnesium, aluminum, hydroxide, and carbonate ions, each of which are disclosed by Morris '143 as being present in a halide ion acceptor (col 8-9).

The Examiner has conceded that "Morris '143 does not specifically disclose hydrotalcite and urea."

The Examiner has accordingly relied upon Kobayashi et al. as disclosing:

... an acrylic rubber composition comprising (1) a halogen containing acrylic rubber and (2) hydrotalcite (abstract). Hydrotalcite is used at 0.5-5 parts by weight per 100 parts by weight of acrylic polymer (page 6, lines 35-40).

and Yagishita as disclosing:

... a curable acrylate-type elastomer composition comprising an epoxy group-containing acrylate type elastomer and urea (abstract). Urea is added at 0.1-10 parts by weight, and is used to regulate vulcanization (col 4, lines 55-66).

Appl. No. 10/693,686

Amdt. Dated June 19, 2006

Reply to Office Action of December 22, 2005

In combining the teachings of Morris, Kobayashi and Yagishita the Examiner takes the position that:

It would have been obvious to one of ordinary skill in the art to add hydrotalcite (of Kobayashi '659) to prevent metal corrosion during crosslinking and add urea (of Yagishita '509) in order to regulate the rate of vulcanization and thus arrive at the instantly claimed invention.

The Examiner has relied upon Tomoshige et al. as disclosing:

... an acrylic rubber composition comprising (1) a halogen containing acrylic rubber and (2) 0.1-20 pts wt hydrotalcite (abstract; paragraph 9-11). Vulcanization accelerators such as quaternary ammonium salts are disclosed (paragraph 17). The hydrotalcites are further specified in paragraph 13 wherein it is disclosed as of the formula $Mg_{4.5}Al_2(OH)_{13}CO_3 \cdot 3.5H_2O$. The preferable quantity of hydrotalcite is 1-10 pts wt in order to achieve a good vulcanization rate while maintaining good preservation stability (paragraph 14).

In combining teachings of Morris, Yagishita and Tomoshige et al. the Examiner takes the position that:

The vulcanized composition resulting from the combination of Morris '143 in view of Yagishita '509 and Tomoshige '426 would intrinsically have a compression set characteristic measured at 150°C for 70 hours which is about 30% or less because both the present composition and the composition resulting from the combined references have the same components and therefore would share the same physical properties.

Further, the Examiner takes the position that:

It would have been obvious to one of ordinary skill in the art to add hydrotalcite (of Tomoshige '426) to achieve a good vulcanization rate while maintaining good preservation stability and add urea (of Yagishita '509) in order to further regulate the rate of vulcanization and thus arrive at the instantly claimed invention.

Appl. No. 10/693,686
Amdt. Dated June 19, 2006
Reply to Office Action of December 22, 2005

It is important to note that Kobayashi et al. incorporate hydrotalcite in order to prevent metal corrosion as discussed on page 1, lines 40-42:

In addition, with regard to prevention of metal corrosion during cross-linking, a method of adding a hydrotalcite to a halogen-containing acrylic rubber (for example Japanese Patent Application Laid-open No. 150409/1990) and a method of adding a silica-based reinforcing filler and a hydrotalcite to a halogen containing acrylic rubber (for example, Japanese Patent Application Laid-open No. 228746/1995) have been proposed. These rubber compositions, however, are also inadequate in respect of the balance between the storage stability and the rate of crosslinking.

According to applicants' invention the hydrotalcite is relied upon to improve the vulcanization rate, compression set characteristics and heat resistant properties as discussed in the last full paragraph on page 7 of applicants' specification:

By using a hydrotalcite in place of the halogen ion acceptor used in the above-mentioned JP-A-50-132057, not only an acrylic elastomer composition having a particularly distinguished vulcanization rate can be obtained in the present invention, but also vulcanization products of the present acrylic elastomer composition have also distinguished heat resistant property and compression set characteristics.

Thus, the results of applicants' invention are not taught or obvious over the prior art.

Applicants teach urea as a vulcanization retardant. The urea is used together with the hydrotalcite

As discussed in the paragraph bridging pages 5 and 6 of applicants' specification in reference to the use of hydrotalcites:

Appl. No. 10/693,686
Amdt. Dated June 19, 2006
Reply to Office Action of December 22, 2005

Below about 0.5 parts by weight vulcanization hardly proceeds, whereas above about 20 parts by weight the vulcanization rate is too much accelerated, resulting in deterioration of scorch stability.

Thus, the Examiner's basis for combining Morris, Kobayashi et al. and Yagishita et al., i.e. "to add hydrotalcite (of Kobayashi '659) to prevent metal corrosion during crosslinking and add urea (of Yagishita '509) in order to regulate the rate of vulcanization" is not at supported in the record.

Applicants add hydrotalcite to achieve a desired vulcanization rate and add the urea to regulate the vulcanization rate.

The prior art, as relied upon by the Examiner does not teach or suggest this combination or functional effect or resulting properties, including compression set and heat resistance.

Further, as discussed in applicants' specification in reference to prior art composition, "secondary vulcanization is indispensable due to the relatively low crosslinking speed." In contract, in the present invention the compression set characteristics are satisfactory even when secondary vulcanization is omitted.

Applicants' composition has distinguishing compression set characteristics and heat resistant properties which are not at all obvious over the Examiner's position of obviousness.

It is also noted that in Morris, di- or polycarboxylic acid bonds with the halide ion acceptor to form acid salts. However, in the present invention, the hydrotalcite is used as a

Appl. No. 10/693,686
Amdt. Dated June 19, 2006
Reply to Office Action of December 22, 2005

halide ion acceptor so that the polyvalent carboxylic acid can function as a crosslinking agent for the halogen-containing acrylic elastomer in the form of free acid, without forming salts.

This fundamental difference has not been considered or taken into account in the Examiner's proposed combination of the prior art. However, it establishes functional characteristics of the primary reference which are either not compatible with the prior art combination, or at least which render the prior art combination unobvious.

The Examiner has relied upon Tomoshige et al. as disclosing halogen containing acrylic rubber and hydrotalcite to improve vulcanization rate.

However, Tomoshige et al. discloses an elastomer that is derived from a blend composition containing a halogen-containing acrylic elastomer and epichlorohydrin rubber. Epichlorohydrin rubber is further used in a large amount in the rubber component, i.e. 40 to 99 %).

Accordingly, the elastomer composition of Tomoshige et al. is quite different from applicants' claimed composition.

In contrast to Tomoshige et al., the present invention relates to an acrylic elastomer composition.

In Tomoshige et al. the compression set characteristics were determined under a condition of 125°C for 7 hours which is a relatively minor condition. According to applicants' invention, the compression set were determined under a condition of 150°C for 70

Appl. No. 10/693,686
Amdt. Dated June 19, 2006
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hours. In such a case, the compression set characteristics of the present invention showed excellent values. Tomoshige et al. does not teach or suggest such results.

In general, acrylic elastomer compositions show considerably poor compression set characteristics.

However, according to applicants' invention the vulcanized acrylic elastomer compositions demonstrate excellent compression set characteristics which are distinguishable other the prior art, including the prior art of record.

Based upon the above distinctions between the prior art relied upon by the Examiner and the present invention, and the overall teachings of prior art, properly considered as a whole, it is respectfully submitted that the Examiner cannot rely upon the prior art as required under 35 U.S.C. §103 to establish a *prima facie* case of obviousness of applicants' claimed invention.

It is, therefore, submitted that any reliance upon prior art would be improper inasmuch as the prior art does not remotely anticipate, teach, suggest or render obvious the present invention.

It is submitted that the claims, as now amended, and the discussion contained herein clearly show that the claimed invention is novel and neither anticipated nor obvious over the teachings of the prior art and the outstanding rejection of the claims should hence be withdrawn.

Therefore, reconsideration and withdrawal of the outstanding rejection of the claims and an early allowance of the claims is believed to be in order.


It is believed that the above represents a complete response to the Official Action and reconsideration is requested.

Appl. No. 10/693,686
Amdt. Dated June 19, 2006
Reply to Office Action of December 22, 2005

If upon consideration of the above, the Examiner should feel that there remain outstanding issues in the present application that could be resolved, the Examiner is invited to contact applicant's patent counsel at the telephone number given below to discuss such issues.

To the extent necessary, a petition for an extension of time under 37 CFR §1.136 is hereby made. Please charge the fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 12-2136 and please credit any excess fees to such deposit account.

Respectfully submitted,


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